

## Building a solid foundation for feedlot NIR

by Kieran Brett

*A two-year project at nine feedlots has significantly boosted the precision with which NIR can predict the feed value of barley, wheat, DDGS and even silage.*

To the naked eye, one truckload of barley unloading at a feedlot might look very much like the next. In fact, each truckload of grain can have a widely variable nutritional composition, and thus, different value for putting pounds on cattle.

Until a few years ago, feedlots were buying grain with one hand tied behind their back. About all they could do was visually inspect a load of feed for plumpness, weigh it and write a cheque. This changed with the advent of Near InfraRed spectroscopy (NIR) technology, which produces an estimate of feed value in just seconds. NIR, which uses lab-tested samples as a baseline for prediction, gets progressively more valuable as more samples are taken and tested.

Between 2011 and 2013, a 26-month study led by scientist Matt May, pictured below, of Feedlot Health Management Services took NIR-related sampling to a whole new level. The project was supported by the Alberta Crop Industry Development Fund (ACIDF) under the \$8 million Feeding Initiative funded by the Alberta Livestock and Meat Agency (ALMA).



*Photo courtesy of Matt May*

As May explains, the project took dead aim at the biggest dilemma faced by feedlot operators when buying grain: the variability of its feed value.

"Growing conditions can affect the composition of barley significantly," says May. "Depending on where the feedlot is located, you can have grain that is drawn from a number of sources. Feedlots in more remote areas may also have an opportunity to buy an individual farmer's grain, so there's more variability."

### Large-scale NIR development

Under this project, a total of 10 NIR instruments were deployed -- nine at feedlots in Alberta and the northwestern United States and one at Feedlot Health Management Services' office in Okotoks. In total, more than 31,000 feed samples were obtained. Roughly 70% of the samples were barley, with the balance consisting of wheat, corn DDGS and silage. Samples were characterized by nutrient composition, expressed in terms of percentage of dry matter, ash, crude protein, starch and fat.

All 31,000 samples were scanned by the facilities' on-site NIR instruments, with a total of 400 samples sent for wet chemistry analysis. Lab results then allowed for the NIR calibrations to be adjusted as needed.

"I'd say it did a very good job for wheat," says May, "but our barley calibration needs work."

The study FHMS recently completed also tried to make this information useful for feedlots as quickly as possible. As May explains, the team divided samples into High, Medium and Low index groups based on the NIR spectra. The long-term goal is to develop an index that feedlots can use to pay for grain based on an accurate prediction of its feeding performance. The project's progress in validating a prediction model for silage will bring further value to feedlots and others.

"Silage is one of the primary sources of roughage for cattle in Alberta," says May, "but it's hard to develop a calibration for it. Our goal was to characterize dry matter, and we wanted to do this without grinding the silage before scanning it.

"When it's ground, the questions that always come up are, did we homogenize it when we ground it? How would it be different with no additional preparation? What we ultimately want is a real-time method to use in the field to characterize the dry matter content."

How efficient is the relationship between grain supplier and feedlot? Lacking hard numbers on nutritional composition, neither side of the transaction fully understands what's being sold and the suitability of the price being paid. That's why NIR is potentially a game-changer. Suppliers can receive full value for nutritionally superior grain. Feedlots can avoid over-paying for lower-quality feed.

To Matt May, that's potentially a win-win that can make everyone more efficient and the entire industry more competitive.

